

Case Report

Survival following accidental ligature strangulation: A case report

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Abstract

Survival following accidental ligature strangulation is quite rare. The present case involves an adult male strangulated by a soft cotton cloth entangled in the rotor of a machine. Unilateral neck compression allowed survival of the victim. The victim escaped with minimal injuries which were limited to contusion of the neck and edema of the vocal cords and inter arytenoid region.

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1. Introduction

Incidents of accidental strangulation are not uncommon. Such cases have been on the rise with rapid industrialization and use of typical public transport vehicles, especially in the developing countries.^{1,2} Design of machines and transport vehicles like scooter, motor cycle and cycle-rickshaw along with lack of proper safety measures and public awareness are the primary reasons behind this. Usually such cases occur at the extremes of life.³ Verma et al.⁴ in their study found 5% of all medicolegal deaths were due to accidental strangulation. In India most of the reported cases are in females due to their traditional dress of saree or chunri used with salwar suit.^{1,2,5} The majority of the cases reported have resulted in death of the victim. We report a case of accidental strangulation of an adult male by a soft cloth, which got entangled in a machine in which the victim survived.

2. Case report

A 45-year-old male patient was brought to the emergency department in the early hours with history of strangulation by a soft, thin, cotton towel wrapped around the neck which got entangled in the rotary part of a stone grinding machine. There was vomiting and convulsions followed by unconsciousness. The patient was rescued by his coworkers who reached the scene after sometime and found him lying unconscious. The patient was there after rushed to the hospital, en route he regained consciousness.

When examined in the hospital emergency the patient was conscious, co-operative and well oriented with no smell of alcohol in breath. His voice was hoarse, however there were no complaints of painful/difficult swallowing. With a respiratory rate of 16/min and oxygen saturation (SPO₂) of 97%, there were no signs of respiratory distress. His pulse was at 82 beats/min and B.P. 120/84 mmHg.

Examination of the neck revealed an incomplete ligature mark 17 cm. long slightly obliquely placed on the right side of the neck extending from the back, 2 cm from the midline upto the front of neck 3 cm left of midline across the thyroid cartilage. It was placed 5 cm from the tip of mastoid process on the right side and 6 cm from the sternal notch on the midline. The surface of the ligature mark was

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abraded and contused with reddish colour and width varying from 2 to 2.5 cm. Muscles on the right side of neck were swollen and contused. There was no tenderness or crepitus over the thyroid or cricoid cartilages and laryngeal crepitus was present. Multiple abrasions were found on the face and right forearm varying in size from 0.5 to 1.5 cm along with a lacerated injury 2 cm in size horizontally placed at the outer end of left eyebrow.

A tongue bite was found on the left margin of the tongue 2 cm from the tip. Bite injuries were also present bilaterally on the buccal mucosa adjacent to the molar teeth. Examination of the pharynx revealed no abnormality. Indirect laryngoscopy revealed congested and edematous vocal cord along with congestion of arytenoid and inter arytenoids region. Both vocal cords and arytenoids were mobile and meeting in the midline without any phonatory gap.

X-ray of the cervical region revealed no bony injury or increase in prevertebral soft tissue shadow. The CT Scan findings of the neck and brain revealed no abnormality.

The patient was admitted under the department of Otorhinolaryngology and Head&Neck Surgery where the wound was sutured and thereafter managed conservatively with oral prednisolone, antibiotics and NSAIDs. The patient recovered completely and was discharged three days later.

3. Discussion

As there was no eye witness, questions were raised regarding the nature of strangulation – accidental or homicidal.

In homicidal strangulations incomplete ligature marks are not impossible but it is very unlikely that it will be restricted to only a part of the neck – right side. Usually in such cases the ligature marks are ‘U’ shaped in front and either sides of the neck with a gap on the back as in garrotting.⁶ The very fact that the ligature mark, in the present case, was only on the right side (Fig. 1) with impressions of folds of ligature material in the front of the neck

(Fig. 2), though not conclusive, yet is sufficient enough to rule out homicidal nature of the incident.

The width of the ligature mark, lack of any deep groove and the impressions of the folds suggests that the ligature material was a broad, soft, thin object which corresponds to the ligating material as disclosed in the history – a thin cotton towel. Twisting of such a cloth can give rise to a ligature mark of 2–2.5 cm width.

Reconstruction of the incidence on the basis of the findings suggests that the towel wrapped around the neck got accidentally entangled in the rotor of the machine and caused compression of the right jugular vein, carotid artery and carotid sinus resulting in rapid loss of consciousness and convulsions. Multiple abrasions on the face and forearm along with the tongue bite (Fig. 3) and bite injuries over the buccal mucosa were the result of convulsions and fall following neck compression. The laceration over the eyebrow was the result of impact with the machine or the ground. Though unconsciousness due to unilateral compression of jugular vein and carotid artery are rare, slight compression over the carotid sinus can stimulate the baroreceptors and result in syncope,⁷ as in this case.

Lateral mobility of the larynx within the neck serves to prevent the severe effects of compression injury⁸ in unilateral neck compression unlike in throttling or garrotting injuries where compression is from the front. The person survived as the neck compression was unilateral which pushed the larynx laterally and thus prevented airway obstruction.

Unlike high velocity injuries which cause fractures of laryngeal cartilages, the main problems with low velocity blunt trauma to larynx is soft tissue injury like edema or bleeding in the paraglottic space, Reinke’s space of vocal cords or inter arytenoids space. The thyroid cartilage when pushed backwards against the cervical vertebrae gets splayed. This can fracture or shatter the thyroid cartilage if it is calcified and rigid. As the thyroid cartilage is compressed against the cervical spine, the arytenoids are sand-



Fig. 1. Ligature mark on right side of neck.



Fig. 2. Impressions of folds of ligature material.



Fig. 3. Tongue bite due to convulsion.

wicked. At worst this can displace the arytenoids and disarticulate the crico-arytenoid joint but at best there will be bleeding or edema in the inter arytenoids fold and subsequent swelling.

Ossification of the thyroid cartilage starts in the postero-inferior region at about 20 years in males and a few years later in females.⁸ In this patient the thyroid cartilage escaped injury inspite of being calcified and the crico-arytenoid joints were also not disarticulated as the compression force was of short duration and not severe enough which was evident from the lack of any deep groove in the ligature mark. However, the inter arytenoid fold, arytenoids and the vocal cords were congested and edematous due to compression injury resulting in hoarseness.

The hypo pharyngeal tissues also escaped severe injury evident by lack of dysphagia/odynophagia, presence of laryngeal crepitus⁹ and absence of increased prevertebral soft tissue shadow in X-ray of cervical region, lateral view.

Damage to the carotid arteries especially to the intima is not uncommon in blunt trauma to the neck. Cases have been reported where low velocity injuries like compression of the neck has also resulted in carotid artery injury.¹⁰ In the present case the carotid artery escaped any injury.

Plattner et al.¹¹ proposed the following classification of strangulation based on degree of severity:

Light strangulation: Confined to skin abrasions and/or reddening of the skin of neck.

Moderate strangulation: Bruising to and/or bleeding from the neck and/or damage to deeper soft tissues of

larynx as exhibited by hoarseness, sore throat and difficulty in swallowing.

Severe strangulation: If the victim presents with petechial bleeding as a result of venous congestion with or without accompanying loss of consciousness.

As per the above classification the present case is moderate degree strangulation due to the presence of contusion in the neck and injury to the deeper soft tissues resulting in hoarseness.

4. Conclusion

As the findings on examination were consistent with history, we could conclude that it was a case of accidental strangulation. In spite of suffering moderate degree strangulation the person, not only survived but also recovered completely without any long term complications, which is quite rare. Precautionary measures should be taken with special regards to the dress while working on machines with wheels or conveyor belts so that any loose cloth is not kept wrapped around the neck. The machines should also be so designed that the rotor or conveyor belt of such machines are well covered.

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